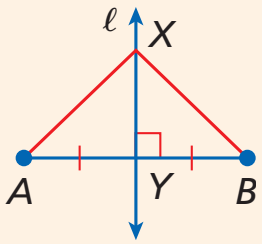
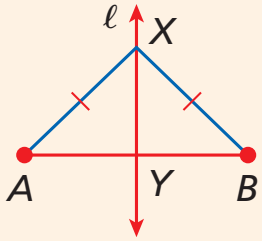
Geometry 5.1 Notes: Perpendicular and Angle Bisectors

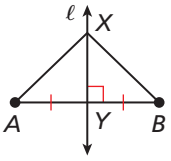
1. What is equidistant?

Theorems Distance and Perpendicular Bisectors

THEOREM	HYPOTHESIS	CONCLUSION
Perpendicular Bisector Theorem If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.	 $\overline{XY} \perp \overline{AB}$ $\overline{YA} \cong \overline{YB}$	$XA = XB$
Converse of the Perpendicular Bisector Theorem If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.	 $XA = XB$	$\overline{XY} \perp \overline{AB}$ $\overline{YA} \cong \overline{YB}$

PROOF

Perpendicular Bisector Theorem



Given: ℓ is the perpendicular bisector of $\overline{AB}$.
Prove: $XA = XB$

Proof:

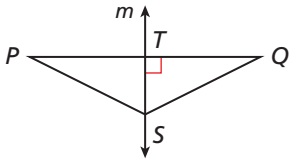
Since ℓ is the perpendicular bisector of $\overline{AB}$, $\ell \perp \overline{AB}$ and Y is the midpoint of $\overline{AB}$. By the definition of perpendicular, $\angle AYX$ and $\angle BYX$ are right angles and $\angle AYX \cong \angle BYX$. By the definition of midpoint, $\overline{AY} \cong \overline{BY}$. By the Reflexive Property of Congruence, $\overline{XY} \cong \overline{XY}$. So $\triangle AYX \cong \triangle BYX$ by SAS, and $\overline{XA} \cong \overline{XB}$ by CPCTC. Therefore $XA = XB$ by the definition of congruent segments.

Geometry 5.1 Notes: Perpendicular and Angle Bisectors

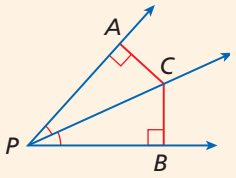
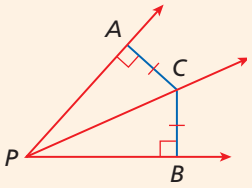
2. What is a locus?

3.

Given that m is the perpendicular bisector of $\overline{PQ}$, $PS = 4a$, and $QS = 2a + 26$, find QS.

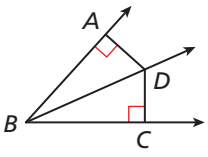


Theorems **Distance and Angle Bisectors**

THEOREM	HYPOTHESIS	CONCLUSION
Angle Bisector Theorem If a point is on the bisector of an angle, then it is equidistant from the sides of the angle.	 $\angle APC \cong \angle BPC$	$AC = BC$
Converse of the Angle Bisector Theorem If a point in the interior of an angle is equidistant from the sides of the angle, then it is on the bisector of the angle.	 $AC = BC$	$\angle APC \cong \angle BPC$

4.

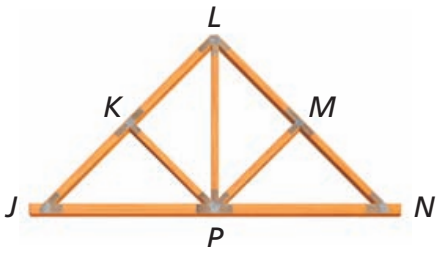
Given that $DA = DC$, $m\angle DBC = (10y + 3)°$, and $m\angle DBA = (8y + 10)°$, find $m\angle DBC$.



Geometry 5.1 Notes: Perpendicular and Angle Bisectors

5.

Carpentry For a king post truss to be constructed correctly, P must lie on the bisector of $\angle JLN$. How can braces $\overline{PK}$ and $\overline{PM}$ be used to ensure that P is in the proper location?



6. Write the equation in point-slope form for the perpendicular bisector of the segment with endpoints J(-7, -5) & K(1, -1)